



# Meeting of UNECE Group of Experts on Gas

## PROSPECTS OF LNG DEVELOPMENT IN REGIONS OF RUSSIA PRODUCTION AND FORMING OF EFFICIENT MARKET



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# Structure of the presentation

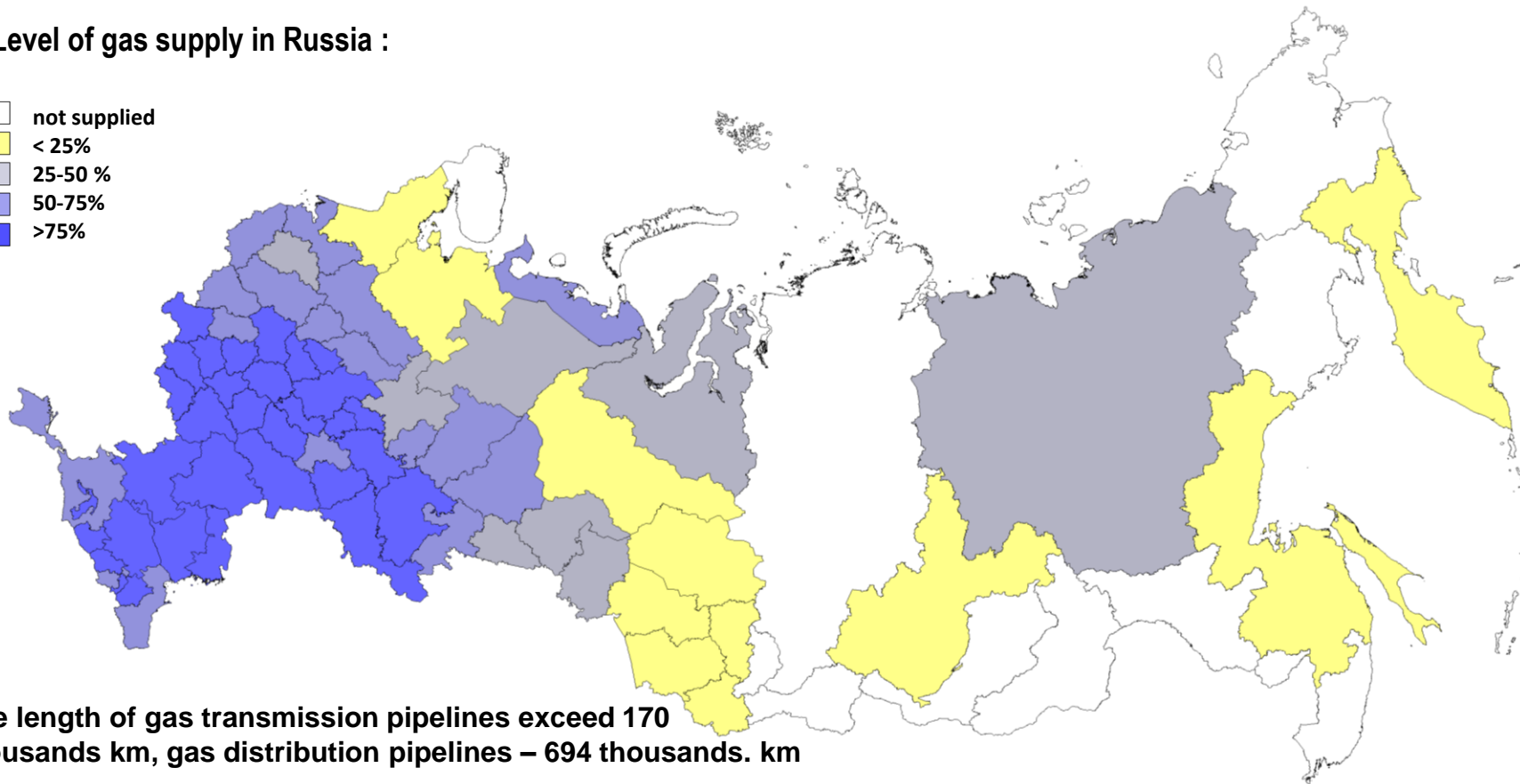
- **Current situation**
- **Prospects of LNG development**
  - ✓ **In regions of Russia**
  - ✓ **On the example of Kostroma region**
- **Problems and solutions**
- **Proposals**



# Current situation with gas supply in regions of Russia

## Level of gas supply in Russia :

- not supplied
- < 25%
- 25-50 %
- 50-75%
- >75%



The length of gas transmission pipelines exceed 170 thousands km, gas distribution pipelines – 694 thousands. km

## Level of gas supply in Russia:

- ✓ natural gas and LPG – 68,7%
- ✓ natural gas – 57,8%

## Level of gas supply for Eastern Siberia and Far East :

- ✓ natural gas and LPG– 27,5%
- ✓ natural gas– 4,1%





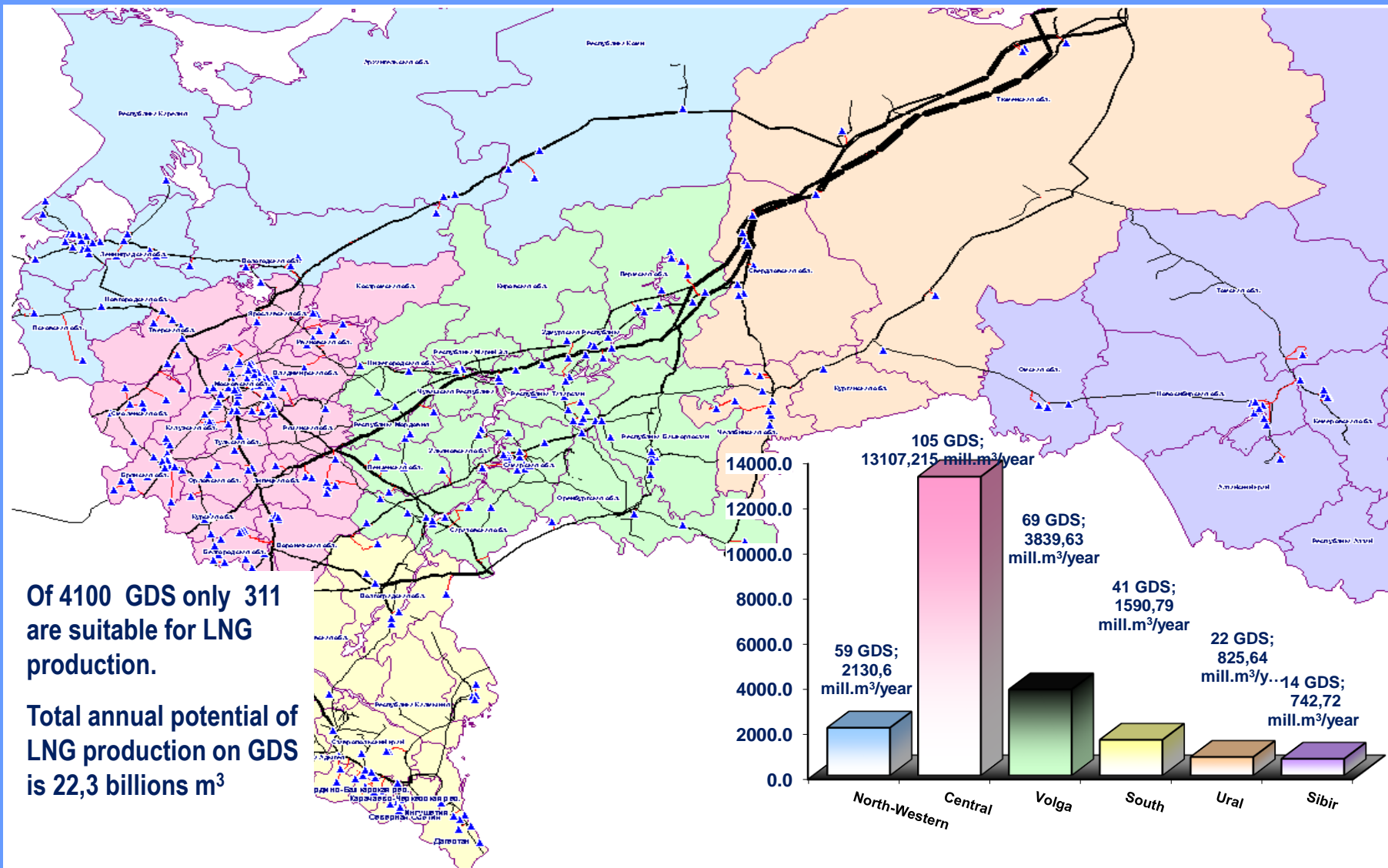
# Prospects of LNG development in regions of Russia

- Level of natural gas supply for regions of Russia – 57,8 %. Objects that are not supply with natural gas are located far from existing natural gas network and their connection to the grid is not economically viable
- It reasonable to convert on LNG only objects that use expensive fuel, such as:
  - ✓ diesel
  - ✓ heavy oil
  - ✓ heating oil
  - ✓ electricity
- Each region of Russia has from 20 to 400 objects, that use diesel, heavy oil, heating oil and electricity as a fuel
- The cheapest ways to produce LNG are – on GDS and CNG stations
- Potential of LNG production on GDS in Russia - 22 ,4 billion standard m<sup>3</sup>/year
- Potential of LNG production on CNG stations in Russia – 1,3 billion standard m<sup>3</sup>/year



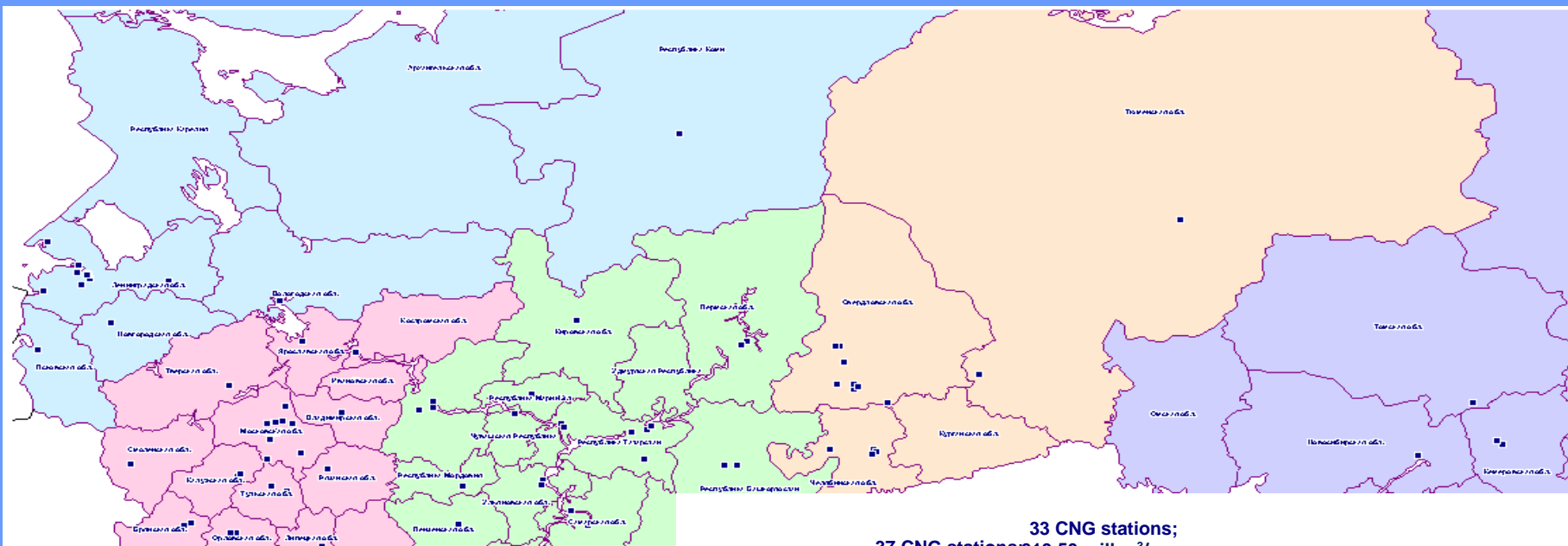


# Potential for LNG production on GDS



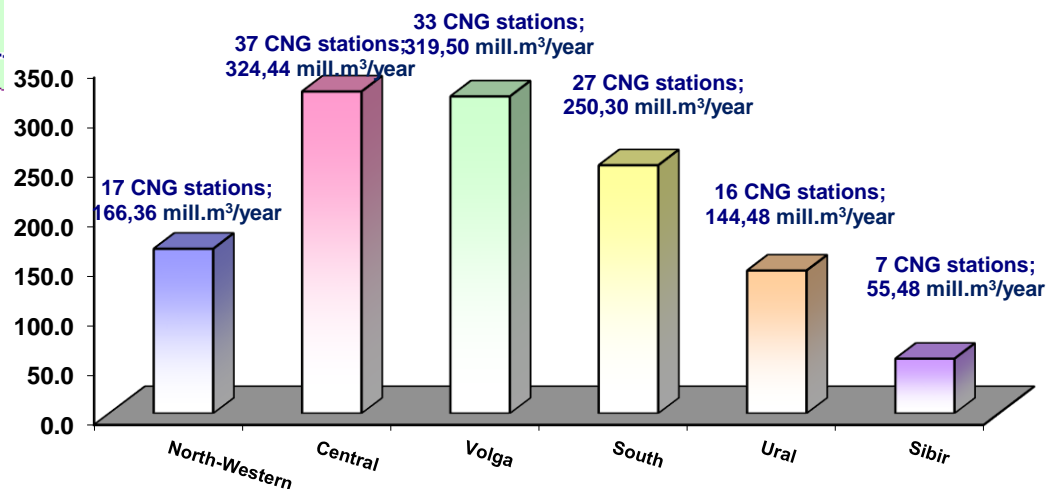


# Potential for LNG production on CNG stations



Of 219 CNG stations:

- ✓ Suitable for LNG production - 137
- ✓ Total annual potential of LNG production on GDS - 1,3 billions m<sup>3</sup>





# Future small-scaled LNG projects



It is planned to build 9 small-scaled LNG plants with total LNG production capacity 1,75 mill. t/year.





# Current state of Kostroma region gas supply

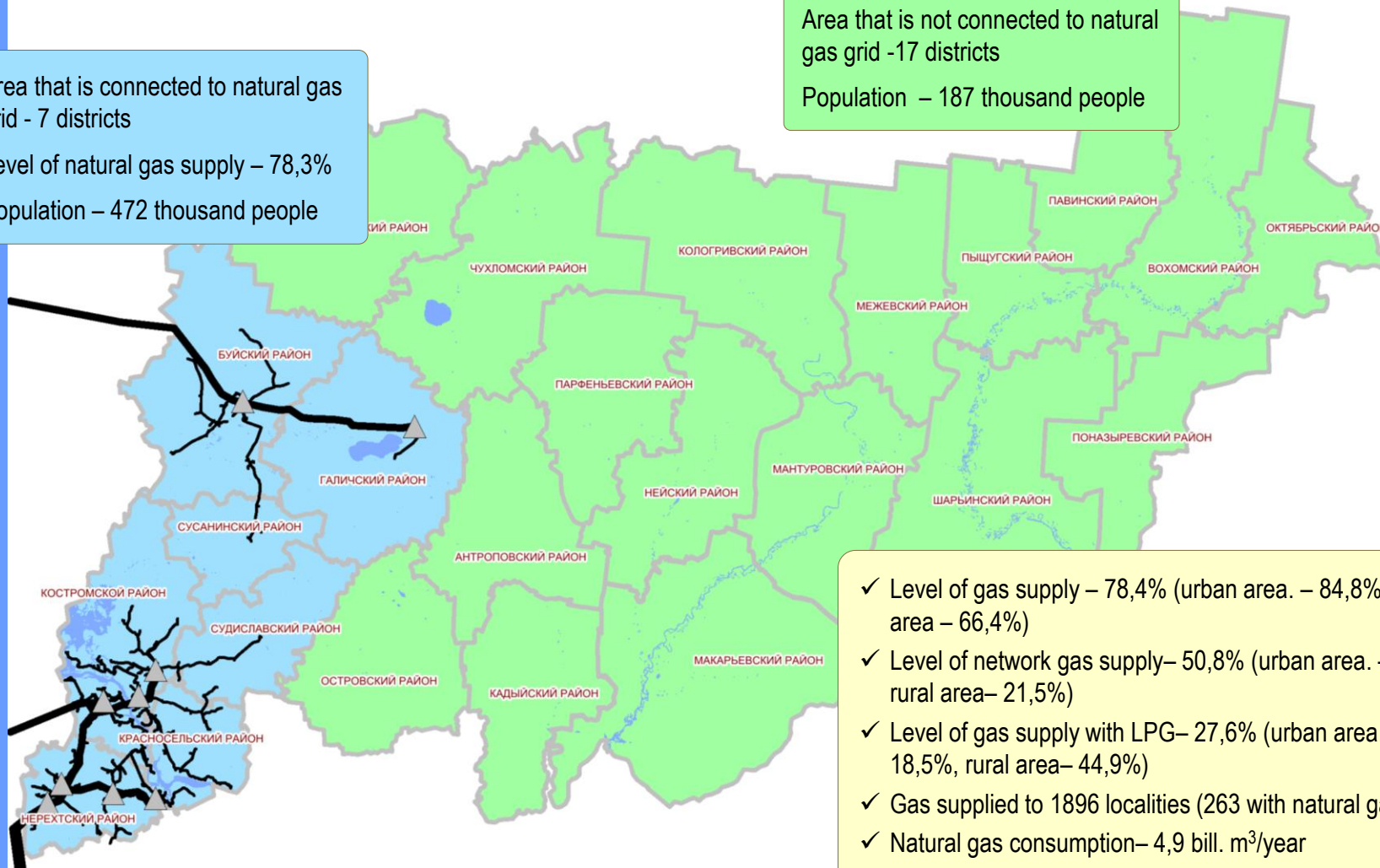
Area that is connected to natural gas grid - 7 districts

Level of natural gas supply – 78,3%

Population – 472 thousand people

Area that is not connected to natural gas grid -17 districts

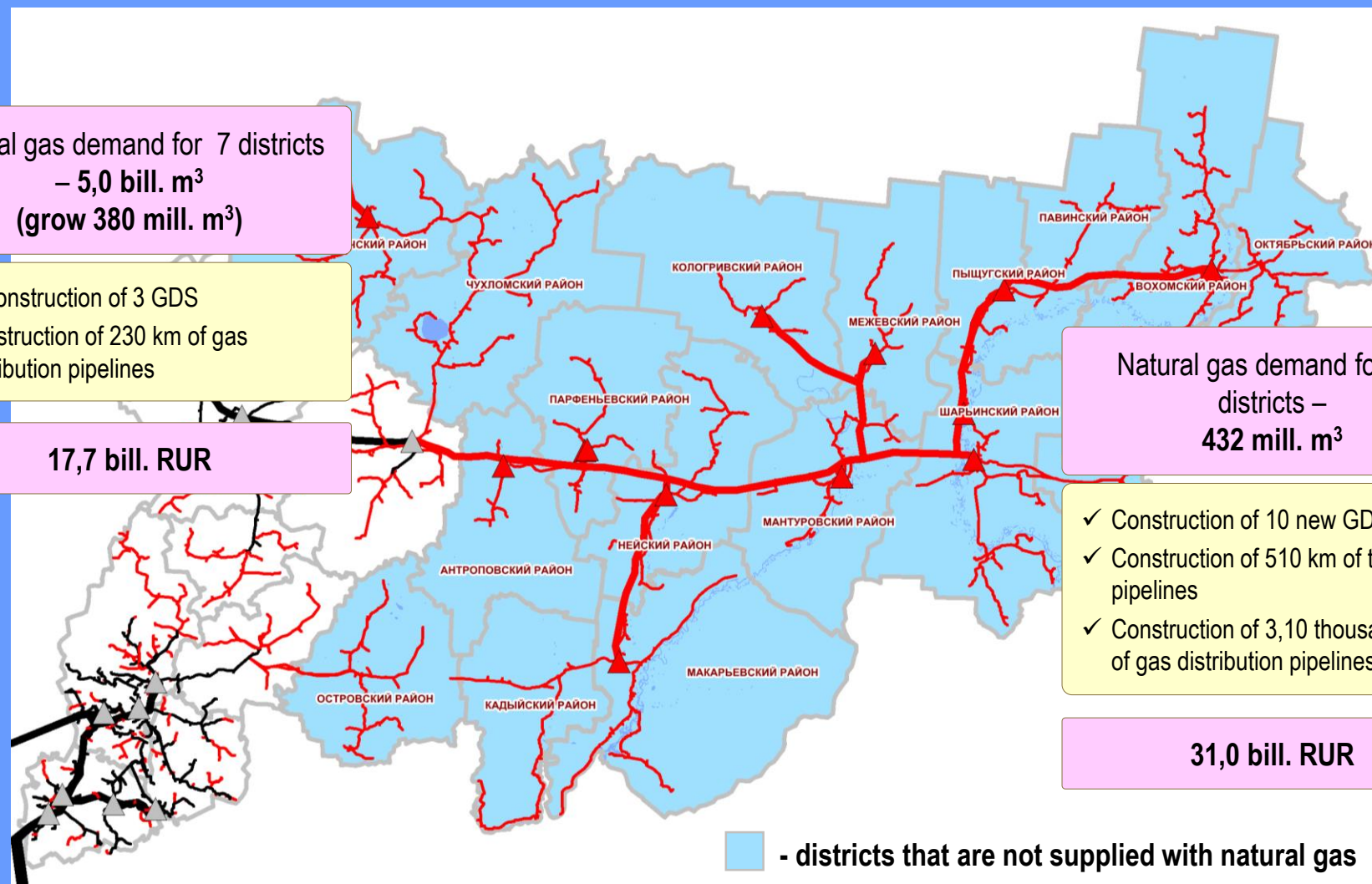
Population – 187 thousand people



- ✓ Level of gas supply – 78,4% (urban area. – 84,8%, rural area – 66,4%)
- ✓ Level of network gas supply– 50,8% (urban area. – 66,3%, rural area– 21,5%)
- ✓ Level of gas supply with LPG– 27,6% (urban area. – 18,5%, rural area– 44,9%)
- ✓ Gas supplied to 1896 localities (263 with natural gas)
- ✓ Natural gas consumption– 4,9 bill. m<sup>3</sup>/year
- ✓ LPG consumption – 3,6 thousand tones

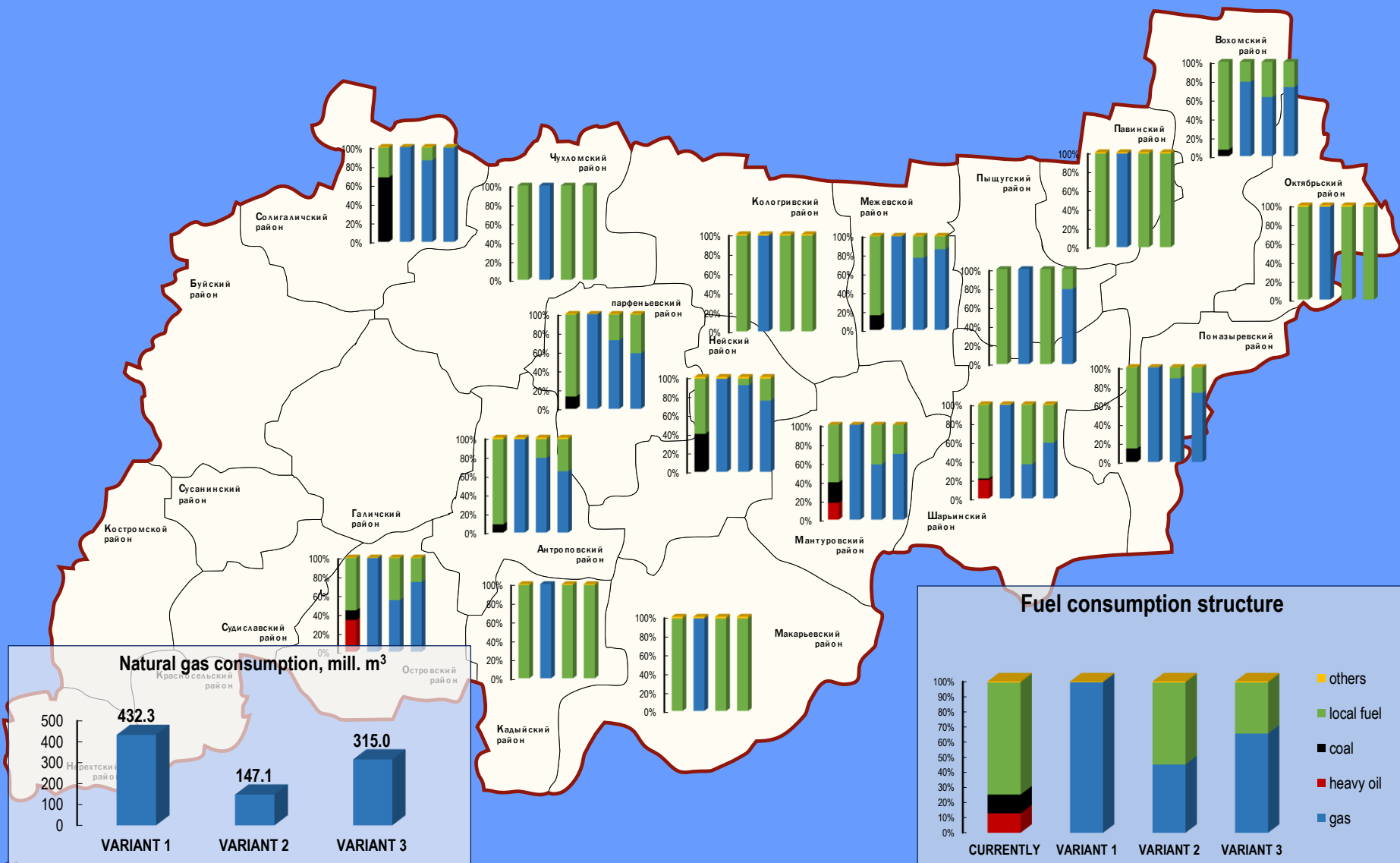


# Prospects of natural gas supply for Kostroma region



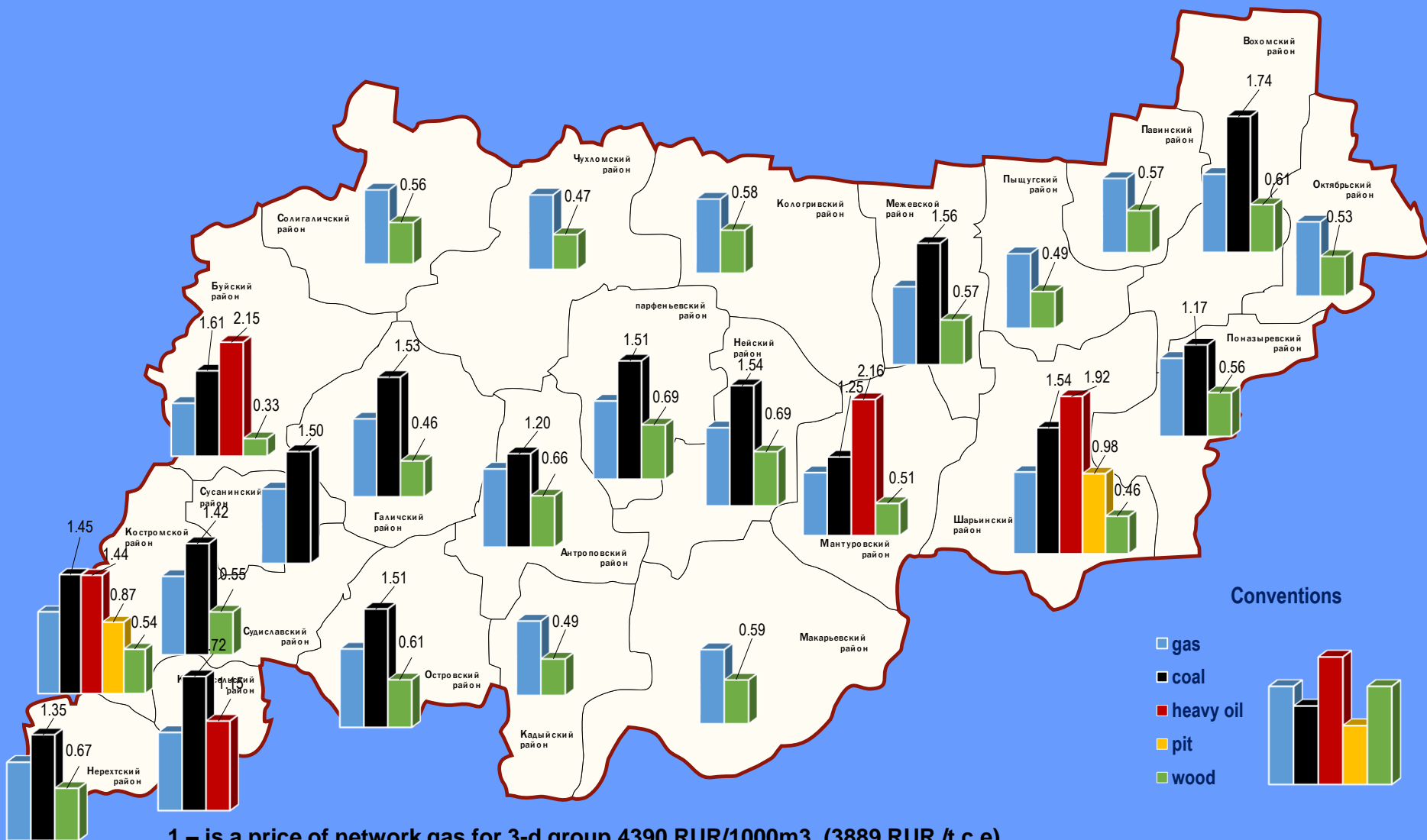


# Fuel balance of districts that are not supplied with natural gas





# Comparison of fuels prices with natural gas prices



1 – is a price of network gas for 3-d group 4390 RUR/1000m3 (3889 RUR./t.c.e).

Deviations of prices for different fuels to natural gas price are:

coal – from 1,15 to 1,74; heavy oil - from 1,15 to 2,16; pit - from 0,87 to 0,98; wood - from 0,33 to 0,69.





# Possible gas consumption in districts that are currently not supplied with gas

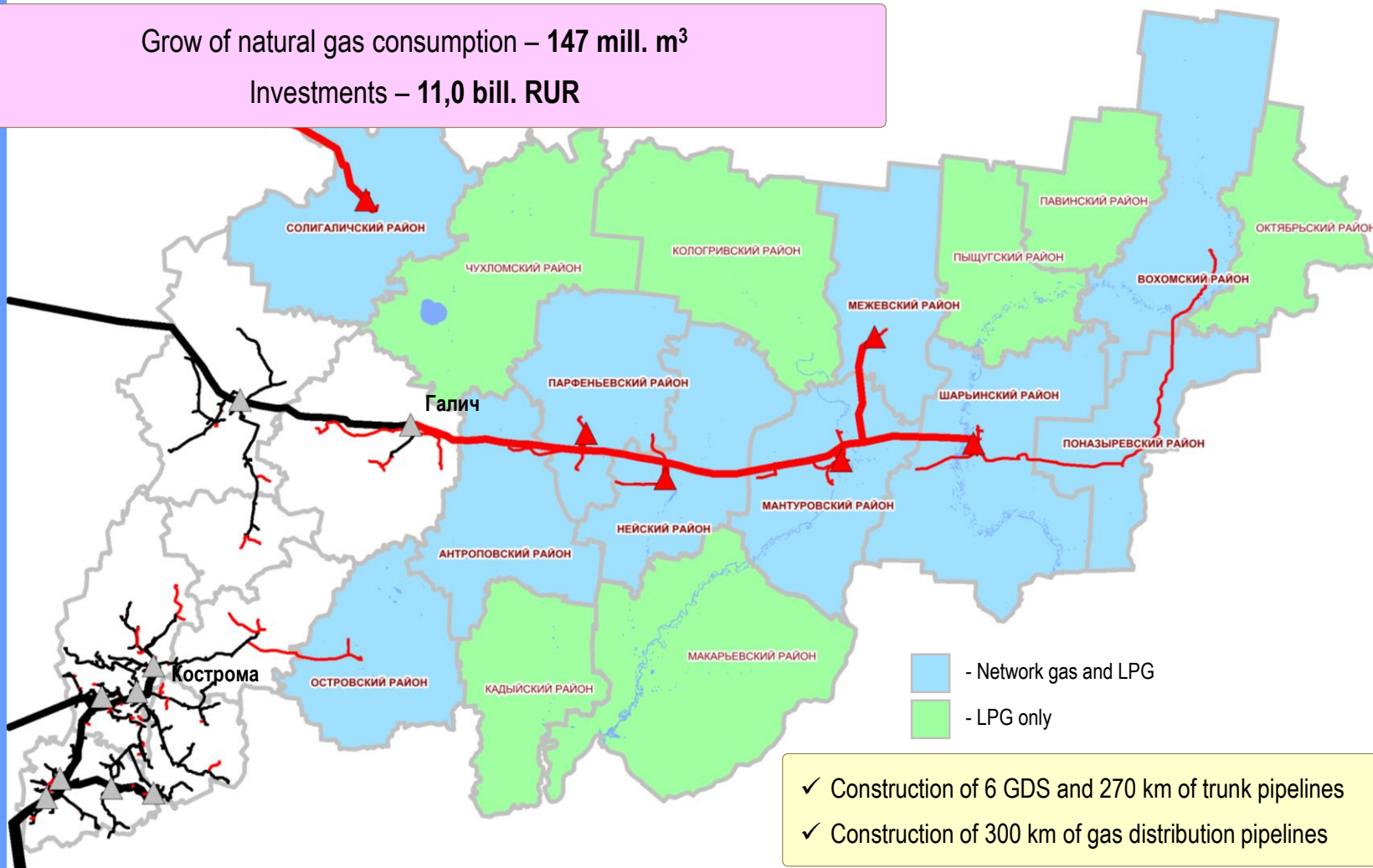
Districts	Possible gas consumption, млн. М³											
	VARIANT 1				VARIANT 2				VARIANT 3			
	TOTAL	population	boilers	CHP	TOTAL	population	Boilers	CHP	TOTAL	population	boilers	CHP
1. Antropovskiy	4,8	2,7	1,5	0	3,3	2,7	0,6	0	3,3	1,8	1,5	0
2. Vohomskiy	8,8	4,7	4,1	0	5,5	4,7	0,8	0	6,4	2,3	4,1	0
3. Kadyiskiy	5,3	4,1	0,8	0,4	0	0	0	0	0	0	0	0
4. Kologrivskiy	4,6	3,1	1,5	0	0	0	0	0	0	0	0	0
5. Makarievskiy	9,1	7,7	1,3	0,1	0	0	0	0	0	0	0	0
6. Manturovskiy	31,9	11,2	20,7	0	24,9	11,2	13,7	0	29,6	8,9	20,7	0
7. Mejevskiy	3,6	2,1	1,5	0	2,6	2,1	0,5	0	3,0	1,6	1,4	0
8. Neiskiy	13,1	4,8	6,0	0	10,3	4,8	5,5	0	10,3	4,3	6,0	0
9. Oktyabrskiy	3,1	2,4	0,7	0	0	0	0	0	0	0	0	0
10. Ostrovskiy	14,4	6,4	8,0	0	7,9	6,4	1,5	0	10,7	2,6	8,1	0
11. Pavinskiy	3,0	2,4	0,6	0	0	0	0	0	0	0	0	0
12. Parfienievskiy	14,4	2,5	2,4	8,8	3,2	2,5	0,7	0	3,2	0,8	2,4	0
13. Ponazyrevskiy	5,6	3,3	1,5	0	4,1	3,3	0,8	0	4,1	2,5	1,6	0
14. Pystchugskiy	3,5	2,6	0,9	0	0	0	0	0	2,7	1,8	0,9	0
15. Soligalichskiy	172,3	5,1	23,2	144,0	24,3	5,1	19,2	0	170,5	3,3	23,2	144,0
16. Chukhlomskiy	6,4	5,7	0,7	0	0	0	0	0	0	0	0	0
17. Sharienskiy	128,4	25,2	54,9	48,3	61,0	25,2	35,8	0	71,3	16,4	54,9	0
<b>TOTAL:</b>	<b>432,3</b>	<b>96,0</b>	<b>130,3</b>	<b>201,6</b>	<b>147,1</b>	<b>68,0</b>	<b>79,0</b>	<b>0,0</b>	<b>315,0</b>	<b>46,3</b>	<b>124,8</b>	<b>144,0</b>



# Gas supply development of Kostroma region (variant – network gas)

Grow of natural gas consumption – 147 mill. m<sup>3</sup>

Investments – 11,0 bill. RUR

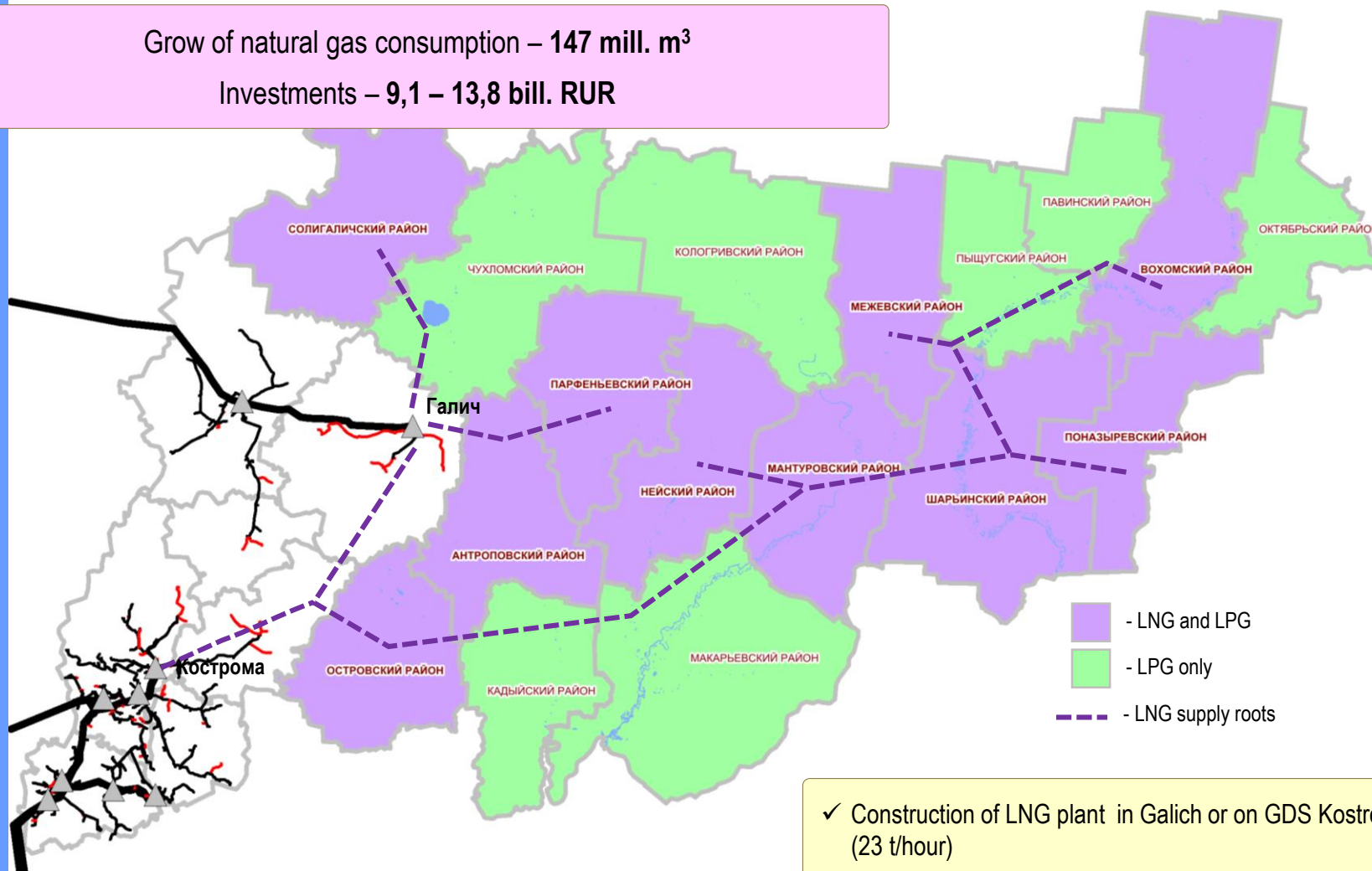




# Gas supply development of Kostroma region (variant - LNG)

Grow of natural gas consumption – 147 mill. m<sup>3</sup>

Investments – 9,1 – 13,8 bill. RUR



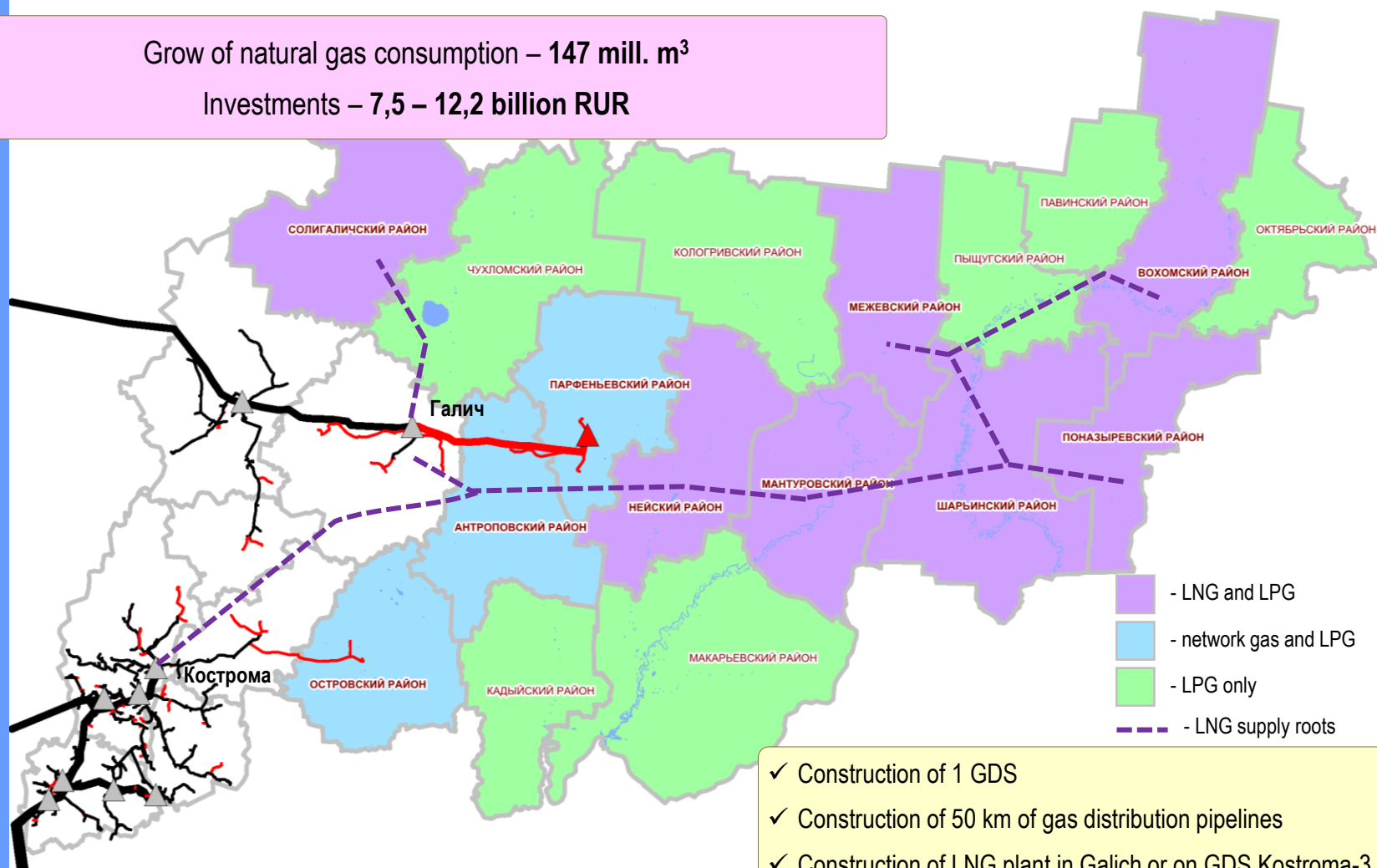
- ✓ Construction of LNG plant in Galich or on GDS Kostroma-3 (23 t/hour)
- ✓ Construction of 16 LNG regasification units



# Gas supply development of Kostroma region (mix variant – network gas and LNG)

Grow of natural gas consumption – 147 mill. m<sup>3</sup>

Investments – 7,5 – 12,2 billion RUR



- ✓ Construction of 1 GDS
- ✓ Construction of 50 km of gas distribution pipelines
- ✓ Construction of LNG plant in Galich or on GDS Kostroma-3 (20 t/hour)
- ✓ Construction of 10 LNG regasification units





# Comparison of different Kostroma region gas supply development's variants

Indicators	Variant 1 (network gas)	Variant 2 (LNG)	Variant 3 (mix of LNG and network gas)
Grow of gas consumption, mill. m <sup>3</sup> /year	147	147	147
Investments, billions RUR, including	11,0	9,1-13,8	7,5-12,2
network gas supply	11,0	-	0,7
LNG gas supply	-	9,1-13,8	6,8-11,5

The recommended variant is Variant 3 (mix of LNG, network gas and LPG)



# Problems of small-scaled LNG market development

## **Low level of legal framework:**

- Outdated requirements of normative documents for LNG infrastructure design and operation
- Difficulties with obtaining approvals for construction
- Fire safety regulations for LNG infrastructure is not match real level of risk

## **High price for domestic equipment :**

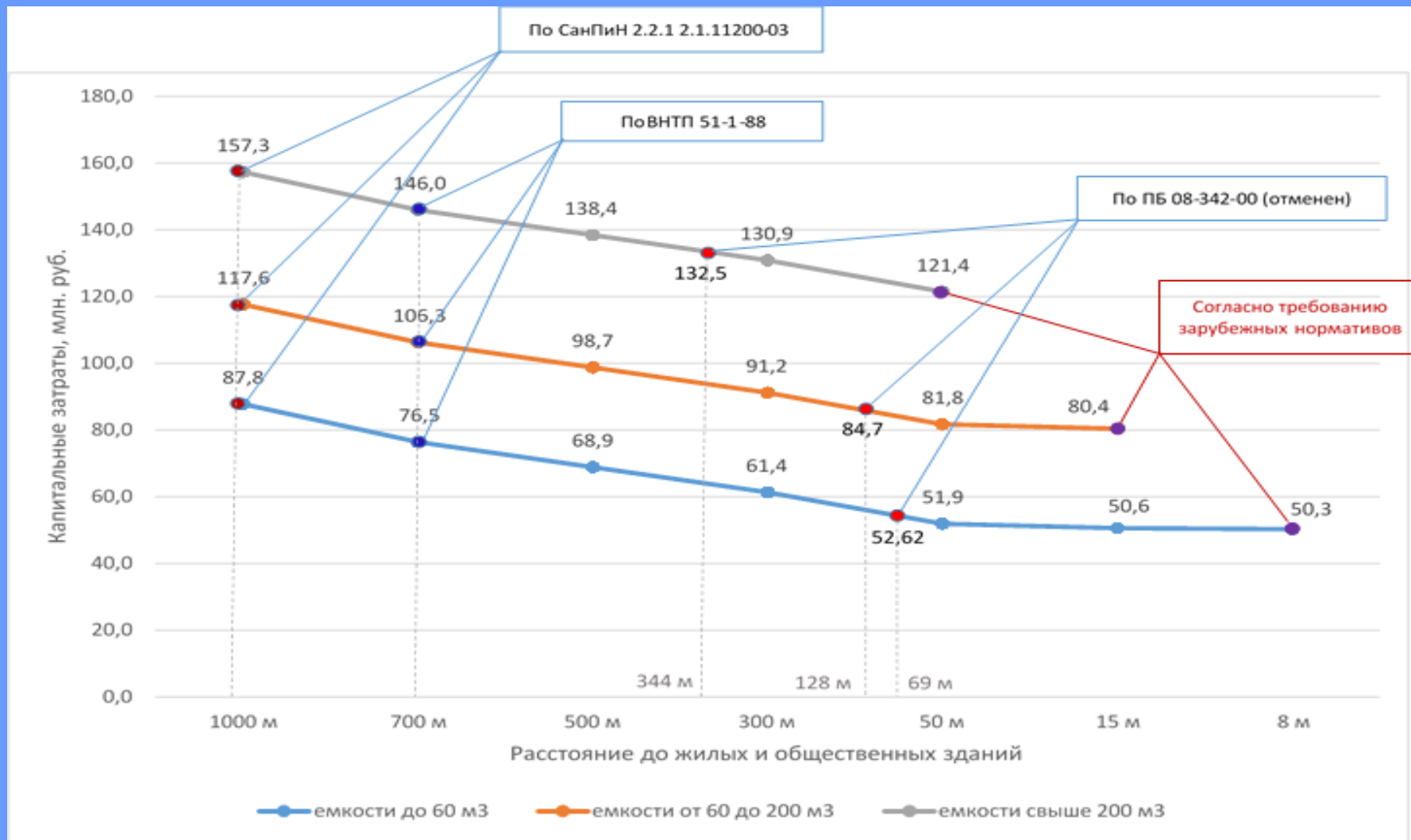
- Low competition level among domestic cryogen equipment producers
- Absence of incentive to develop technologies an decrease cost of equipment

## **High gas price for end-user:**

- Absence of LNG pricing mechanisms
- Big share of foreign equipment that price is dependent on economic situation
- Absence of interaction mechanisms among LNG gas supply participants



# Comparison of Russian and foreign norms for LNG infrastructure placement (example – Kostroma region)



Necessary to change Russian norms in accordance with foreign. Requirements changing from Russian to foreign decrease autonomy gas supply projects capital cost and improve projects economic.



**THANK YOU!**